

IN THE UNITED STATES DISTRICT COURT  
FOR THE WESTERN DISTRICT OF WISCONSIN

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SSI TECHNOLOGIES, LLC,

Plaintiff,

v.

OPINION and ORDER

DONGGUAN ZHENGYANG ELECTRONIC  
MECHANICAL LTD,

20-cv-19-jdp

Defendant.

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This case is again before the court after remand from the Federal Circuit. This court had granted summary judgment to defendant Dongguan Zhengyang Electronic Mechanical LTD (DZEM) on the grounds that it did not infringe either of the two patents-in-suit and to plaintiff SSI Technologies, LLC, that DZEM could not prevail on its counterclaim for tortious interference. Dkt. 199. On appeal, the Federal Circuit affirmed in part, but it held that this court's construction of the term "filter" in '038 patent was wrong. As a result, SSI's claim for infringement of the '038 patent is again viable. And many of the parties' motions that were denied as moot now require decisions.

This order addresses the previously briefed issues that are now relevant in light of the Federal Circuit's decision. The court assumes familiarity with the background of the invention and the accused device, which is provided in the court's prior decision. Dkt. 199. The court won't summarize all its rulings here, but the bottom line is that the court concludes that the DZEM sensor infringes the '038 patent, and that the '038 patent is not invalid. The case will proceed to trial on damages.

## ANALYSIS

### **A. SSI motion to exclude untimely proposed claim constructions and expert disclosures**

The court begins with a motion that could affect the materials the court considers in deciding the pending motions for summary judgment.

SSI moves to exclude several claim constructions proposed by DZEM, which it says are untimely. Dkt 90. The court requires that parties in patent litigation disclose their proposed claim constructions early in the case. *See* Dkt. 14. The court's intent for this requirement is that the parties' experts can address all the proposed claim constructions in their initial reports. The claim constructions that SSI challenges were first raised in DZEM's expert's rebuttal report and then proposed by DZEM as part of the chart of claim terms requiring construction, Dkt. 72, which the court requires as part of its summary judgment procedure. The purpose of that chart is to identify those claim terms that remain in dispute and that are relevant to the motions for summary judgment. The summary judgment chart of claim terms is not an opportunity to introduce new constructions.

DZEM has disclosed new proposed claim constructions after the experts have provided their opening reports. The court is not persuaded by DZEM's argument that the new terms are justified because SSI has shifted its own claim constructions. The court sees no material shift in SSI's claim constructions. Nor are DZEM's late-disclosed claim constructions harmless because SSI did not have an opportunity to respond to those constructions.

The court will grant SSI's motion as to the late-disclosed proposed claim constructions for the phrase "substantially prohibit one or more gas bubbles of the fluid from entering the sensing area." The court will not consider DZEM's untimely proposed claim construction and related expert disclosures.

SSI also moves to exclude invalidity opinions regarding claim construction of the term “covering” and the purported indefiniteness of the terms “characteristic” and “fluid channel” that DZEM’s expert raised for the first time in his rebuttal report. DZEM does not cite the challenged opinions in its summary judgment submissions, so those opinions aren’t material to the summary judgment decision. Nevertheless, the court will grant SSI’s motion on these untimely opinions, too, so that it’s clear that these issues may not be revisited at trial.

## **B. Infringement of the ’038 patent**

### **1. Construction of the term “filter”**

This court, in its previous summary judgment decision, adopted DZEM’s construction of the term “filter” as “a porous structure defining openings and configured to remove impurities larger than said openings from a liquid or gas passing through the structure.” Dkt. 199, at 14. The Federal Circuit held that that construction was erroneous, and it adopted SSI’s construction that the term “filter” means “a device containing openings through which liquid is passed that blocks and separates out matter, such as air bubbles.” *SSI Techs., LLC v. Dongguan Zhengyang Elec. Mech. LTD.*, 59 F.4th 1328, 1336 (Fed. Cir. 2023). Before we turn to the motions before the court, the Federal Circuit construction needs a few words of explanation.

The Federal Circuit rejected this court’s construction requiring a “porous structure” because the specification did not support a requirement that the openings be small ones and because the term porous would give rise to further disputes. As the Federal Circuit put it, “[A]s long as the openings in the filter are small enough to prevent at least some gas bubbles from entering the sensing area, the openings need not be smaller than any particular maximum size.” *Id.* The Federal Circuit’s construction of the term “filter” maintains the idea that a filter works

by using a structure with openings to “block and separate” particles of material larger than the openings.

Two critical points emerge from the Federal Circuit’s explanation of its interpretation that will be relevant to the court’s validity analysis. One is that there are other means of removing gas bubbles from a fluid that do not use a “filter.” As explained below, the prior art that DZEM cites against the ’038 patent uses non-filter methods of removing gas bubbles. The other critical point from the Federal Circuit’s explanation is that a filter need not be perfectly effective: all that is required is that it remove at least some gas bubbles.

## **2. Infringement analysis**

SSI moved for summary judgment that the DZEM sensor infringes claims 9, 10–13, and 18, of the ’038 patent. DZEM opposes SSI’s motion on the grounds that its sensor lacks two elements: the claimed “transducer” and a “filter.”

As for the transducer, there is no genuine dispute about the operation of the DZEM sensor. It has a transducer that emits a pulse of sound into the measurement area, and that pulse of sound is reflected back to the transducer. When the reflected sound pulse strikes the transducer, the transducer sends an electronic signal to a processor, identified as the “controller” in the ’038 patent. The time between initial emission of the sound and the electronic signal is the “time of flight” needed for the sound to traverse a known distance through the fluid. The time of flight is used by the controller to calculate the concentration of the fluid in the sensor. The dispute concerns whether the transducer is configured to “output a characteristic of the fluid based on the received pulse of sound.”

DZEM contends that the signal output by the transducer is not itself a “characteristic of the fluid.” The characteristic of the fluid—its concentration in the diesel engine application

that matters here—is calculated by a microprocessor using the signals from the transducer and information about the size of the sensing area and the temperature of the fluid. Implicit in DZEM’s argument is a claim construction that requires the transducer itself to calculate the characteristic of the fluid. But such a construction is inconsistent with the specification, which describes how the concentration sensor works: “The concentration time-of-flight (ToF) of the acoustic wave signal is output to the sensor control system of the sensor system.” ’038 patent, at 3:66–4:1. The specification makes clear that the transducer is configured to output a characteristic of the fluid by transmitting a signal representing the time of flight to a control system, which then calculates the fluid concentration using that information. There is no genuine dispute that the DZEM sensor is configured with information about the size of the sensing area and the temperature of the fluid, and that it calculates a characteristic of the fluid based on the signal output of the transducer.<sup>1</sup> Thus, the transducer outputs a “characteristic of the fluid” in the sense that it outputs a signal with the information used to determine the concentration of the fluid. That is precisely how the operation of the transducer is described in the specification.

As for the filter element, again there is no dispute about the working of the DZEM sensor. The sensing area has a cover with openings. SSI’s expert conducted tests that showed that the openings allowed fluid to pass, but that large bubbles were blocked by the cover. Dkt. 80, ¶¶ 81–82. DZEM disputes SSI’s proposed facts about those tests solely on the basis of a claim construction that the cover of the sensing area is not a filter. Dkt. 137, ¶¶ 114, 115. That claim construction has been rejected by the Federal Circuit. DZEM does not dispute the

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<sup>1</sup> DZEM’s opinion counsel conceded that the DZEM sensor had a transducer configured to output a characteristic of the fluid based on the received pulse of sound. Dkt. 94-22, at 13.

underlying facts demonstrated by the testing by SSI’s expert, which shows that the cover blocks and separates at least some bubbles from the sensing area. Under the claim construction of the term “filter” that the court must apply on remand, there is no genuine dispute that in the DZEM sensor, the cover of the sensing area is a filter.<sup>2</sup>

The court concludes that the DZEM sensor infringes independent claim 9. DZEM makes no separate infringement argument for dependent claims 10–13 and 18, and it concedes the material facts pertaining to the additional elements in each of these claims. Dkt. 137, ¶¶ 140–55. Accordingly, the court concludes that the DZEM sensor infringes dependent claims 10–13 and 18. The court will grant SSI’s motion and deny DZEM’s on the issue of infringement of the ’038 patent.

### **C. Validity of the ’038 patent**

#### **1. Construction of the term “chimney”**

The court did not need to construe the term “chimney” for its infringement analysis, because it’s undisputed that the DZEM sensor has a chimney under either side’s definition. But the definition matters for the invalidity analysis.

SSI contends that “chimney” means:

a hollow structure extending vertically above the sensing area through which a gas, such as air, is permitted to pass.

DZEM proposes a broader definition:

opening adapted to permit air bubbles to exit the sensing area.

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<sup>2</sup> DZEM’s opinion counsel concluded that the filter element was a means-plus-function claim under § 112, and thus the term “filter” was restricted to the structures disclosed in the specification, which is to say a mesh filter. Dkt. 94-22, at 14–15. That was the basis for DZEM’s infringement counsel’s non-infringement position. But that position is not tenable after the Federal Circuit decision holding that “filter” was not restricted to mesh filters.

DZEM's definition includes any opening through which air bubbles might escape the sensing area; SSI's definition is limited to structures that extend vertically above the sensing area.

DZEM's argument is based exclusively on the claim language, which requires "a chimney configured to exhaust entrapped air from the sensing area." Dkt. 113 at 5 (citing '038 patent claim 9, at 6:52–53). But DZEM ignores the specification, which describes the chimney in some detail. The specification describes how the invention uses filters to remove at least some gas bubbles from the fluid as it flows into the sensing area. It goes on to describe embodiments that include a "chimney," which allows additional bubbles to escape from the sensing area:

In embodiments having a chimney, the gas bubbles which collect within the sensing area or sensing areas, i.e. those bubbles which are smaller than the aperture size of the filter screen, are acted upon by the forces of gravity and convection causing the gas bubbles to flow out of the measurement channel through the chimney in the case of the concentration sensor, or up the level sensing tube in the case of level sensor (i.e., the level sensing tube acts as an exhaust allowing the trapped gas bubbles to flow upward and out). Once bubbles have exited the sensing areas they are free to escape up through the liquid within the tank to a surface of the fluid.

'038 patent, at 5:44–55 (reference numbers removed). This passage describes how bubbles are acted upon by the forces of gravity and convection, which is to say that they float upward, and then flow up and out of the chimney. An example chimney is shown in Figures 7–10, identified with reference number 270. The chimney depicted is a short vertical hollow cylinder.

The term chimney is not a term of art in the field of automotive sensors. General-purpose dictionary definitions of chimney include the core concept of a vertical structure that carries away smoke or fumes. For example:

a vertical structure incorporated into a building and enclosing a flue or flues that carry off smoke or other undesirable fumes or

gases; [especially] the part of such a structure extending above a roof

Webster’s Third New International Dictionary of the English Language Unabridged (1971). If the inventor had intended to refer to any opening that would allow the escape of accumulated bubbles, the more general term “vent” would have been appropriate. *See id.* (defining “vent” as “an opening or hole for the escape or passage of something (as of a gas or liquid)”).

The court will adopt SSI’s definition of chimney, because it is supported by the specification and comports with the plain language use of the term.

## 2. Anticipation

Both sides move for summary judgment on anticipation. DZEM moves for summary judgment that the ’038 patent is anticipated by three pieces of prior art: U.S. Patent Application Publication No. 2011/0228641 (Niemann); U.S. Patent Application Publication No. 2012/0152015 (Beyer); U.S. Patent No. 5,456,108 (Birkett). SSI’s motion addresses all the art asserted by DZEM, which includes these three, plus Japanese Publication JP4842728B2 (Satoyuki). Each of these four references is prior art, and each describes and claims a sonic fluid sensor. Each also recognizes the problem that gas bubbles in the fluid interfere with the accuracy of the sensor.

But the solution to the gas bubble problem addressed in Niemann, Beyer, and Birkett does not involve a “filter” as that term has now been defined for purposes of this case.

Niemann discloses a pre-chamber through which foamy fluid flows before it enters the measurement section of the stillwell. Niemann ¶¶ 38, 39. Niemann describes various means of slowing the flow of foamy fluid while it is in the prechamber, and the extended time in the pre-chamber allows gas bubbles to dissipate before the fluid enters the measurement section. Nowhere does Niemann describe using openings to *block and separate* gas bubbles from the fluid.



Niemann's pre-chamber removes gas bubbles from the fluid to be measured, but it does not do so by means of any filter.

Beyer and Birkett are similar. They also use a pre-chamber where bubbles escape from the fluid before entering the measurement area. Birkett describes what it calls a stillwell surrounded by concentric sleeves that create annular spaces vented at the top to allow accumulated bubbles to escape. Birkett 3:8–24. Beyer describes an inlet chamber where bubbles in foamy oil can rise to the surface before the fluid enters the measuring chamber. Beyer ¶¶ 9, 10, 11. Neither of these have a filter. And Beyer explicitly contrasts its bubble-reduction method from filters, contending that the inlet chamber method avoids the clogging problem typical of filters. Beyer ¶ 5.

Because Niemann, Birkett, and Beyer each lack a filter, they do not anticipate any of the asserted claims of the '038 patent. DZEM's motion for summary judgment on this point must be denied.

SSI's motion also asserts that the '038 patent is not anticipated by Satoyuki.<sup>3</sup> Satoyuki discloses an ultrasonic testing device that determines the concentration of a fluid as it flows through a pipe. The pipe application is different from the tank application discussed in the '038 patent, but the '038 patent is not limited to tank applications. Satoyuki addresses the problem of air bubbles interfering with the accuracy of the measurement of the sound through

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<sup>3</sup> DZEM relies on a machine translation of Satoyuki. Dkt. 94-26. The translation bears the notice: "This translation is machine-generated. It cannot be guaranteed that it is intelligible, accurate, complete, reliable or fit for specific purposes. Critical decisions, such as commercially relevant or financial decisions, should not be based on machine-translation output." The court questions whether the machine translation would be admissible evidence to support DZEM's invalidity case. But SSI doesn't object on that ground, so the court will follow the parties and rely on it.

the fluid. Satoyuki uses a hollow cylinder positioned within the pipe to shield the sensing area. The fluid enters the cylinder through a series of small liquid inlet holes arranged in rows on the upstream side of the cylinder. The liquid inlet holes block at least some gas bubbles from entering the sensing area inside the cylinder. So Satoyuki discloses a filter under the definition that the court applies on remand. But Satoyuki does not disclose a chimney.

Satoyuki provides liquid outlets for the fluid to exit at the downstream side of the hollow cylinder. The liquid outlets are positioned directly opposite the rows of inlet holes. Satoyuki teaches that gas bubbles remaining in the fluid will follow the fluid flow from the inlet holes to the liquid outlets without entering the center area of the cylinder, thereby leaving the center area clear for accurate measurement.

Since a continuous flow of the liquid L to be measured in the ultrasonic wave propagation region is generated, even minute bubbles that have once entered the ultrasonic wave propagation region ride on the flow of the liquid L to be measured. The liquid is easily discharged from the liquid outlet and does not swirl or stay in the ultrasonic wave propagation region.

Dkt. 94-26, at 10 (reference numbers removed).

Satoyuki uses a completely different mechanism to remove the residual gas bubbles that get through the filter. The bubbles that enter the cylinder do not float to the top and escape through a vertical structure, as in the '038 patent. Rather, the bubbles remain suspended in the fluid, and the flow of fluid through the cylinder carries the bubbles straight through to the liquid outlets. The liquid outlets are not vertical structures positioned above the sensing area. So they are not chimneys, as that term is used in the '038 patent. And therefore Satoyuki does not anticipate any of the asserted claims, all of which include the chimney.

SSI is entitled to summary judgment that the '038 patent is not anticipated.

### 3. Obviousness

DZEM contends that the '038 patent is obvious in light of several combinations of prior art. SSI moves for summary judgment that the '038 patent is not obvious. DZEM did not move for summary judgment on the issue, suggesting that summary judgment would be inappropriate given that obviousness is necessarily a fact-intensive inquiry.

DZEM defends SSI's motion on obviousness by relying on these combinations:

- Niemann or Birkett in combination with either China Patent Publication CN202381147 (Gu) or Japan Patent Publication JP2004317288 (Koji);
- Koji in combination with Gu;
- Japan Patent JP4842728 (Satoyuki) in combination with Gu; and
- U.S. Patent 5,319,973 (Crayton) in combination with Koji.

Dkt. 113 at 67–70.

Obviousness is a legal conclusion based on underlying facts, including “the scope and content of the prior art, the differences between the prior art and the claimed invention, the level of ordinary skill in the art, and any relevant secondary considerations.” *Allergan, Inc. v. Sandoz, Inc.*, 726 F.3d 1286, 1290–91 (Fed. Cir. 2013). The issue is not impervious to summary judgment if the material facts are not genuinely disputed. To survive SSI's motion for summary judgment, DZEM must adduce evidence that would allow a reasonable jury to find “by clear and convincing evidence that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success from doing so.” *Bristol-Myers Squibb Co. v. Teva Pharm. USA, Inc.*, 752 F.3d 967, 973 (Fed. Cir. 2014).

Here, the parties' arguments about obviousness focus on the scope and content of the prior art and the differences between the prior art and the claimed invention. The parties do

not dispute the level of ordinary skill in the art, nor do they invoke that concept in their arguments about obviousness. SSI includes a brief argument about its commercial success as a relevant secondary consideration.

There are two fundamental problems with DZEM's obviousness case. First, as SSI contends, Dkt. 97, at 49–60, none of the references in DZEM's proposed combinations disclose a “chimney,” an element in all the asserted claims. To establish obviousness, the asserted references must expressly teach each claim element or the record must disclose a reason for a person of ordinary skill in the art to modify the prior art to obtain the missing element. *Beckson Marine, Inc. v. NFM, Inc.*, 292 F.3d 718, 727 (Fed. Cir. 2002).

To support its contention that the '038 patent is invalid for obviousness, DZEM relies exclusively on Gu for an express disclosure of a chimney.<sup>4</sup> DZEM's expert, Ganssle, asserts that the exhaust hole in Gu constitutes a “chimney.” Dkt. 102-1, at 137. But the chimney in the '038 patent is “configured to exhaust entrapped air from the sensing area.” The exhaust hole in Gu allows gas bubbles to escape from a filtration component that filters the fluid *before* it enters the area of the fluid level sensor. Thus, although Gu discloses an exhaust hole, it is not a chimney as defined in the '038 patent because it does not exhaust gas from the sensing area.<sup>5</sup>

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<sup>4</sup> DZEM's first proposed combination of prior art includes Niemann or Birkett in combination with Koji. But DZEM concedes that Koji does not disclose a chimney, Dkt. 137, ¶¶ 277–78, so it has failed to show that either of those combinations contain all the elements of the asserted claims.

<sup>5</sup> SSI proposed as a fact that exhaust hole in Gu does not vent gas from the sensing area, Dkt. 137, ¶ 284. SSI supported the fact with an expert declaration, Dkt. 83, ¶ 108. DZEM purported to dispute the fact by citing Gu. Dkt. 94-29. But DZEM's response doesn't address the critical point in SSI's proposed fact: the exhaust hole in Gu does not vent gas from the sensing area. Gu itself confirms this proposed fact, so the court deems it to be undisputed.

Because Gu does not disclose a chimney, DZEM has failed to show that all the elements of the asserted claims are present in the first three proposed combinations of prior art.

In the fourth combination, Crayton with Koji, DZEM's expert concedes that Crayton does not expressly disclose a chimney. But he contends that a chimney is inherently disclosed. Dkt. 102-1, at 159. Crayton discloses an ultrasonic fuel level sensor that uses a float positioned within a sensing tube. Crayton's innovation is the use of ultrasonic means, rather than mechanical means, to determine the position of the float. Ganssle's explanation concerning the chimney is that Crayton teaches that bubbles form in the sensing tube, and that the portion of the sensing tube above the float is a hollow structure extending vertically above the sensing area. Thus, according to Ganssle, the top part of the sensing tube would necessarily allow gas bubbles to escape the sensing area.

Ganssle's inherency analysis has several flaws. First, Crayton teaches that gas bubbles might accumulate on the surface of the float, so it teaches the use of nickel plating on the float to reduce surface tension and inhibit the adhesion of air bubbles. But Crayton says nothing about allowing air bubbles to escape from the sensing area. Second, Crayton teaches that the float should be "closely spaced to the inner surface of the tube." Dkt. 94-30, at 2:63–65. If the float is closely spaced to the inner surface of the tube, gas bubbles may not have space to rise past the float and escape through the top portion of the tube. Crayton does not inherently disclose a chimney unless gas bubbles escape past the float as a necessary and natural consequence of the described configuration. Mere possibility is not enough to establish an inherent disclosure. *Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1325, 1332 (Fed. Cir. 2010). Third, the '038 patent expressly distinguishes between a chimney configured to exhaust entrapped air from the sensing area and a level-sensing tube that allows gas to escape through

it. '038 patent, at 5:44–55. The chimney structure is unnecessary if the sensing tube is itself a vertical tube, which is why the chimney is present only in some embodiments and claims. Fourth, a party must meet a high standard to use an inherent disclosure to establish obviousness, *PAR Pharm., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1195–96 (Fed. Cir. 2014), and Ganssle's superficial explanation of the purported inherent disclosure of a chimney in Clayton doesn't meet it.

This point leads to the second fundamental problem with DZEM's obviousness case: Ganssle's report is extremely conclusory about why a skilled artisan would combine the references, how the teachings of the references could be combined, and why a skilled artisan would expect to be successful in combining them. Conclusory assertions about obviousness like Ganssle's are not enough to survive summary judgment. "To invalidate a patent claim based on obviousness, a challenger must demonstrate by clear and convincing evidence that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so." *ActiveVideo Networks, Inc. v. Verizon Commc'ns, Inc.*, 694 F.3d 1312, 1327 (Fed. Cir. 2012) (quotations and citations omitted).

Ganssle provides his most extensive explanation of how one of skill in the art would combine references with the proposed combination of Niemann or Birkett with Gu or Koji. The full explanation, a scant 90 words, is quoted here in its entirety:

Substituting the mesh structure from Gu or the permeable structure in Koji for the stillwell arrangements of either Niemann or Birkett would be a matter of substitution of a known structure for prohibiting bubbles, and would thus be obvious. Moreover, use of the mesh structure of Gu or the permeable structure of Koji is simpler and less expensive than the stillwell arrangement of Niemann and Birkett, and thus a person of ordinary skill in the

art would be motivated to use the mesh or permeable membrane structures to simplify construction.

Dkt. 102-1, ¶ 66. The discussion is extremely superficial. Ganssle does not acknowledge that Beyer, which he cited as anticipating prior art, actually teaches away from the use of mesh filters because of the tendency of those filters to clog. Beyer ¶ 5. Ganssle offers no explanation of how a permeable structure could be substituted for a stillwell, nor any explanation of why the mesh or permeable structure would work as effectively as a stillwell. Nor does he offer any support of his assertion that a mesh or permeable structure would be less expensive than a stillwell arrangement. He doesn't address the chimney element at all. Ganssle's explanations of the other proposed combinations of prior art are even more conclusory. Ganssle's explanations of the combinations are, like the ones in *Active Video Networks*, too conclusory to constitute clear and convincing evidence that one of skill in the art would be motivated to combine the references and have a reasonable expectation of success in doing so.

Finally, SSI contends that its diesel fluid sensor was commercially successful, particularly after it introduced the patented filter and chimney improvements in 2014. Dkt. 97, at 60–62. DZEM's only argument in response is that SSI's sensor is not covered by the '038 patent. Dkt. 113, at 63. DZEM purports to support this argument with Ganssle's rebuttal report, Dkt. 118-1, ¶¶ 12–45. But Ganssle bases his analysis on constructions of the terms “filter” and “transducer” that the court has rejected in the infringement analysis above. Accordingly, the court concludes that it is not genuinely disputed that the SSI diesel fluid sensor practices the asserted claims of the '038 patent, and that SSI's commercial success is evidence of non-obviousness that DZEM has not rebutted.

The court will grant SSI's motion that the '038 patent is not invalid as obvious.

#### 4. Section 112 issues

Section 112 of the Patent Act imposes formal requirements on United States patents. Three of these formal requirements are at issue in this case: definiteness, written description, and enablement. DZEM contends that the '038 patent is invalid because it fails to meet them. Both sides move for summary judgment on the § 112 issues.

##### a. Definiteness

Section 112 requires that the claims of a patent be set out in definite terms:

(b) Conclusion.—

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

35 U.S.C. § 112(b). This requires that a “patent’s claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910 (2014).

DZEM’s sole argument on definiteness is that the claim element requiring that the filter “substantially prohibit one or more gas bubbles of the fluid from entering the sensing area” makes no sense because a single bubble is either prohibited or it is not. There is no way to “substantially” prohibit a single bubble. DZEM supports its argument with Ganssle’s expert report, Dkt. 82, ¶ 86, which makes the same assertion.

The court is not persuaded for three reasons. First, Ganssle’s report is conclusory and unhelpful on this point. It cites no evidence, conducts no analysis, and invokes no technical expertise. Second, a filter could prohibit a portion of a single larger bubble by breaking it into smaller bubbles and prohibiting some of those from entering the sensing area. Dkt. 137, ¶ 82 (SSI proposed fact supported by Strzelec expert report and technical literature). Third, the



Federal Circuit considered this limitation and professed no difficulty in understanding it. 59 F.4th at 1336.

The court concludes that the asserted claims of the '038 patent are not indefinite.

**b. Enablement**

The enablement requirement is set out in subsection (a), which provides:

(a) In General.—

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

35 U.S.C. § 112(a). The enablement requirement is that the specification must teach one of skill in the art to practice the full scope of the claimed invention without undue experimentation. *Liebel-Flarsheim Co. v. Medrad, Inc.*, 481 F.3d 1371, 1378 (Fed. Cir. 2007). The enablement requirement serves two purposes. First, it ensures adequate public disclosure of the claimed invention and how to practice it, and second it prevents overclaiming, by which an inventor might claim technology that he did not really invent.

DZEM contends that the specification of the '038 patent fails to enable the claimed limitation of a “transducer configured to . . . output a characteristic of the fluid based on the received pulse of sound.” DZEM’s enablement argument has three components. First, the specification doesn’t teach one how to make a transducer that outputs a characteristic of a fluid. Second, the specification doesn’t teach one how to make a sensor that uses sound outside the ultrasonic frequency range. And third, the specification teaches a sensor for only a limited number of characteristics of a fluid.

As for the first component, DZEM's argument is that the specification does not teach one to configure a transducer to output a characteristic of a fluid because that's not what transducers do. A transducer simply converts energy from one form to another. DZEM's argument here is really a claim construction argument about what it means to "configure" a transducer, which the court has already rejected in the infringement analysis above. The type of transducer referred to in the '038 patent converts a signal (in the form of a voltage spike) into an emitted pulse of sound, and it converts a received pulse of sound into to a voltage spike, which in turn functions as another signal. The '038 patent calls for a transducer *configured* to output a characteristic of a fluid, which means that the timing of the voltage spike signals is processed by a control system, which calculates the fluid concentration or other quality of a fluid. Sonic fluid sensors were well known in the art at the time of the invention, as shown by the prior art cited by DZEM in support of its obviousness case. One of skill in the art would know how to configure a transducer to work in one. *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1366 (Fed. Cir. 1997) ("[The] specification need not disclose what is well known in the art."). The novel aspects of the '038 patent relate to the use of a filter and chimney arrangement to reduce bubbles in the sensing area, thereby improving the accuracy of the sonic sensor. The novel aspects of the invention are taught with sufficient detail, and DZEM doesn't contend otherwise.

As for the second component, DZEM's argument is that the specification of the '038 patent teaches only the use of ultrasonic frequencies, but it claims the use of sound generally, including both audible and infrasonic frequencies. The patent does not teach one how to practice the full scope of the claimed invention, the argument goes, because it does not teach one to use audible or infrasonic sound in a fluid sensor.

DZEM cites *Enzo Life Sciences., Inc. v. Roche Molecular Systems, Inc.*, 928 F.3d 1340, 1345 (Fed. Cir. 2019), for the rule that the full scope of the claim must be enabled. The principle is well established, but *Enzo Life Sciences* demonstrates the importance of considering the factual context of the enablement inquiry.<sup>6</sup> *Enzo Life Sciences* involved a patent, in the then-burgeoning field of molecular biology, that claimed a broad category of polynucleotides that were both hybridizable and detectable upon hybridization. The Federal Circuit held that the claims were not enabled because the specification taught one how to synthesize only a few of the claimed polynucleotides, but there were tens of thousands of polynucleotides that might fall within the claims, and only individual testing would confirm whether a particular polynucleotide met the claimed functional requirements. It was critical to the Federal Circuit's analysis that the art of polynucleotide synthesis was novel and unpredictable at the time of the invention. In such a novel and unpredictable field, an inventor who had come up with only a few example molecules could not lay claim to a broad category of molecules without teaching those of skill in the art how to master the broad category itself.

But the '038 patent is a late entrant in the predictable field of mechanical and electronic devices, and the use of sonic fluid sensing was well understood in the art at the time of the invention. One of skill in the art would be able to readily determine the sonic frequencies suitable to sensing a characteristic of a fluid. That very low frequencies would not be suitable for the claimed application would be understood by those of skill in the art. This is not a case

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<sup>6</sup> In considering whether any required experimentation is undue, the court considers a number of factors, including “(1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims.” *Enzo Life Scis., Inc.*, 928 F.3d at 1345 (quoting *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988)).

analogous to *Enzo Life Sciences* where one of skill in the art is left to consider tens of thousands of potential frequencies in hopes of finding some that work. Some frequencies, the lower ones, are unsuitable for sonic sensing in a diesel fluid tank, but those unsuitable frequencies are not a mystery.

It's important in this context that the novel aspects of the invention of the '038 patent do not include the well-known fundamentals of sonic fluid sensing, such as the selection of the particular sonic frequency to be used. Cases in which the specification failed to meet the enablement requirement because it did not enable the full scope of the claims all involved a failure of teaching related to the novel aspects of the invention. *See, e.g., MagSil Corp. v. Hitachi Glob. Storage Techs., Inc.*, 687 F.3d 1377, 1381 (Fed. Cir. 2012). The court has found no case in which a lack of enablement was found based on well-understood features of the background technology. There is no risk of overclaiming here. If some future inventor discovers some way to use low-frequency sound to test a characteristic of a fluid, she would be free to practice that technique and secure patent protection for it. The '038 patent wouldn't stand in her way—it would simply prevent her from using the filter and chimney arrangement to improve the accuracy of the low-frequency sensing.

As for the third component, DZEM makes a similar argument about “characteristic of a fluid.” The asserted claims are directed to “characteristics” without limitation, so the argument goes, but the specification teaches only the sonic sensing of fluid level and concentration. The argument is unpersuasive. The inventor of the '038 patent was not required to figure out and expressly claim every possible use of the invention. “Our case law is clear that an applicant is not required to describe in the specification every conceivable and possible future embodiment of his invention.” *Rexnord Corp. v. Laitram Corp.*, 274 F.3d 1336, 1344 (Fed.

Cir. 2001). It would be within the knowledge of one of skill in the art that only some characteristics of a fluid are amenable to sonic sensing, because sonic sensing is based on the principle that sound travels at different speeds through different materials. If the characteristic of the fluid is one that affects the speed at which sound travels through the fluid, that characteristic is amenable to sonic testing. Once again, the claims do not fail the enablement requirement because the specification fails to teach what one of skill in the art already knows or can readily figure out.

DZEM also offers another variant of its enablement argument that is related to the utility requirement in § 101 of the Patent Act. DZEM contends that by claiming sonic sensing generally, without limitation to specific frequencies, SSI has claimed inoperative structures that will not actually work. Structures that do not work violate the utility requirement in § 101 and cannot possibly be enabled. But “[i]t is not a function of the claims to specifically exclude . . . possible inoperative substances.” *Atlas Powder Co. v. E.I. du Pont De Nemours & Co.*, 750 F.2d 1569, 1576 (Fed. Cir. 1984) (quoting *In re Dinh-Nguyen*, 492 F.2d 856, 858–59 (CCPA 1974)). The inclusion of inoperable material within a patent claim does not render the claim non-enabled, so long as one of skill in the art can identify the operable material without undue experimentation. *Atlas Powder Co.*, 750 F.2d at 1576. DZEM has pointed to no evidence that one of skill in the art would have any difficulty identifying those frequencies suitable for sonic testing. Nor has DZEM pointed to any evidence that one of skill in the art would have any difficulty identifying those characteristics of a fluid that would be amenable to sonic sensing.

DZEM makes an enablement argument specific to dependent claim 11. Claim 11 provides:

11. The sensor of claim 9, wherein the filter is configured to disperse one or more gas bubbles to produce a homogenous fluid

entering the fluid channel, prohibit one or more gas bubbles from entering the sensing area, or both.

'038 patent, at 7:1–4. DZEM didn't raise the issue in its own summary judgment motion. DZEM's brief in opposition to SSI's motion makes a single argument: claim 11 is not enabled because it doesn't identify what the fluid channel is. Dkt. 113, at 51. DZEM did not propose that fluid channel was a claim term needing construction, so the court will give the phrase its plain meaning. Dkt. 14 at 3; Dkt. 72. The term uses two common and readily understood English words, which taken together and read in context identify the channel that the fluid travels after it passes through the filter and into the sensing area. A patent does not have to be flawlessly drafted to be comprehensible; the court concludes that a person of ordinary skill in the art would have no trouble understanding the term fluid channel.<sup>7</sup>

DZEM bears that burden to demonstrate the lack of enablement by clear and convincing evidence. The court concludes that it has failed to adduce evidence that could meet that burden. The court will grant summary judgment to SSI on the issue of enablement.

### **c. Written description**

The written description requirement also derives from 35 U.S.C. § 112(a). The essence of this requirement is that the patentee, "as part of the bargain with the public, must describe his or her invention so that the public will know what it is and that he or she has truly made

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<sup>7</sup> DZEM also contends that if dependent claim 11 is not enabled, then the related independent claim 9 cannot be enabled either. DZEM relies on *ABS Global, Inc. v. Inguran, LLC*, 914 F.3d 1054, 1069–74 (7th Cir. 2019), for this principle. In patent cases, Seventh Circuit precedent is binding on procedural matters, but the court must follow the Federal Circuit on substantive patent law. Substantive patent law from the Federal Circuit recognizes that, in some situations, lack of enablement in a dependent claim could logically imply a lack of enablement in the related independent claim. But DZEM cites no Federal Circuit authority holding that a lack of enablement in a dependent claim necessarily implies the lack of enablement of the related independent claim.

the claimed invention.” *AbbVie Deutschland GmbH & Co., KG v. Janssen Biotech, Inc.*, 759 F.3d 1285, 1298 (Fed. Cir. 2014). The standard for satisfying the requirement is whether the disclosure “allows one skilled in the art to visualize or recognize the identity of the subject matter purportedly described.” *Alcon Research Ltd. v. Barr Labs., Inc.*, 745 F.3d 1180, 1190 (Fed. Cir. 2014) (citations and quotation marks omitted). The purpose of the written description requirement is to prevent the patentee from claiming more than he or she invented. Whether a claim satisfies the written description requirement is a question of fact. *Id.* When the material facts are undisputed, the question is amenable to summary judgment.

DZEM’s argument about written description mirrors its enablement argument. As DZEM puts it:

As discussed with respect to nonenablement, the specification includes no disclosure that would suggest that the inventors possessed a transducer that was capable of outputting a fluid characteristic based on a received sound pulse.

Dkt. 113, at 52. DZEM’s argument is, in essence, that if the specification does not teach one how to practice an aspect of the invention, then that aspect cannot have been described in sufficient detail to demonstrate that the inventor was in possession of it. The court finds DZEM’s argument unpersuasive for the same reasons that it has rejected DZEM’s enablement argument. Again, the specification does not have to describe every conceivable embodiment of the invention. The inventor of the ’038 patent has made sufficiently clear the scope of his invention, which is a sonic fluid sensor that uses filters and a chimney to improve the accuracy of the sonic measurements.

SSI is entitled to summary judgment on the written description requirement.

## **5. Lack of utility under § 101**

SSI moves for summary judgment on the ground that DZEM did not plead an affirmative defense based on § 101, which limits patents to inventions that are actually useful. SSI is correct: DZEM failed to plead that the '038 patent was invalid under § 101, and it did not specifically oppose SSI's motion for summary judgment on the issue. DZEM's arguments about utility are properly considered an aspect of enablement, as discussed above. The court will grant SSI's motion for judgment that the '038 patent is not invalid under § 101.

### **D. DZEM motion to exclude or limit SSI's experts**

DZEM asks for leave to file a *Daubert* motion to limit the testimony of two SSI experts, Daniel Van Der Weide and Andrea Strzelec. Dkt. 197. The motion was filed after the parties moved for summary judgment, so the court will not consider the motion in the context of the summary judgment. DZEM contends that it inadvertently omitted the *Daubert* motion from its pretrial filings on Friday August 27, 2021, so it filed the motion on the next business day. The court will overlook the untimeliness. Whatever prejudice SSI would have suffered has long dissipated.

But the court will deny the motion on the merits. The motion is moot with regard to Van Der Weide. His opinions about the infringement of the '153 patent are immaterial because that patent is no longer part of the case. So that leaves the motion to exclude Strzelec's opinion that the DZEM sensor infringes the '038 patent.

DZEM's main argument is that SSI's experts concede that the best way to understand the operation of the transducer and the controller of the DZEM sensor is to review the source code, but Strzelec did not do that. Instead, to determine how the DZEM sensor worked,



Strzelec relied on DZEM marketing materials and the non-infringement opinion of DZEM's counsel.

The court is not aware of any requirement that an expert use the "best" evidence concerning the operation of the accused product. Of course an expert must base her opinions on reliable evidence, but DZEM does not contend that the marketing material or the non-infringement opinion contain any inaccurate information about the DZEM sensor. Moreover, none of the claims of the '038 patent are directed to the source code of the sensor or to how the source code operates. So the court is not persuaded that the source code is necessary evidence of whether the DZEM sensor infringes the '038 patent.

DZEM's second argument is that Strzelec disregards the claim language in her analyses. DZEM's arguments are simply claim construction arguments repackaged as a *Daubert* motion. These arguments provide no basis to exclude or limit Strzelec's testimony.

#### **E. SSI motion to strike DZEM's rebuttal report on damages**

DZEM served the report of its damages expert, Linsey Fisher, Dkt. 149-3, two weeks after the deadline to do so without SSI's consent. SSI asks the court to strike the report. Dkt. 148. The motion would have had some traction in 2021 when the report was filed because we were closing in on trial. But now there's time for SSI to depose Fischer, so the harm to SSI has dissipated. The court will deny SSI's motion to strike Fisher's rebuttal report.

#### **F. SSI motion to compel freedom to operate opinions**

SSI moved to compel, among other things, DZEM's freedom to operate letters. Dkt. 59. DZEM declined to produce them. A May 31, 2018 freedom to operate opinion had been disclosed to DZEM customers, which led Magistrate Judge Crocker to conclude that DZEM had waived its privilege on the disclosed letter and any other letter that cited the opinions of

its two U.S. law firms. Dkt. 141. Judge Crocker ordered DZEM to produce its other freedom to operate letters for in camera review for privilege. DZEM provided documents to the court on July 20, 2021. The documents consist of a July 13, 2018 freedom to operate letter with a supporting search report and a set of cited references.

DZEM's argument against disclosure was that the other freedom to operate opinions didn't address the patents-in-suit and are therefore irrelevant. The court has reviewed the letter and concludes that it is relevant to willfulness. The freedom to operate letter does not specifically address the patents-in-suit, as DZEM had contended. But the scope of the search itself is relevant to whether DZEM's freedom to operate opinion represents a good faith effort to avoid infringement or a cover for willful infringement. DZEM is to produce the letter and supporting documents to SSI by May 30, 2024.

### CONCLUSION

The court concludes that SSI is entitled to summary judgment that the '038 patent is valid and infringed. The only issue remaining for trial is damages, which includes the question of whether DZEM's infringement was willful.

### ORDER

IT IS ORDERED that:

1. Plaintiff SSI Technologies, LLC's motion to strike untimely claim construction and expert disclosures, Dkt. 90, is GRANTED.
2. Defendant Dongguan Zhengyang Electronic Mechanical LTD's motion for partial summary judgment, Dkt. 98, is DENIED with respect to infringement and validity of the '038 patent.
3. SSI's motion for summary judgment, Dkt. 92, is GRANTED in part:

- a. The DZEM sensor infringes claims 9–13 and 18 of the '038 patent.
  - b. The '038 patent is not invalid.
4. In all other respects, the court's previous opinion and order on summary judgment, Dkt. 199, stands.
5. DZEM's motion for leave to file motion to partially exclude the opinion and testimony SSI's experts, Dkt. 197 is DENIED.
6. SSI's motion to strike untimely rebuttal expert report on damages, Dkt. 148, is DENIED.
7. SSI's motion to compel, Dkt. 59, is GRANTED. DZEM is to produce its freedom to operate letter and supporting documents to SSI by May 30, 2024.

Entered May 23, 2024.

BY THE COURT:

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JAMES D. PETERSON  
District Judge